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BARLEY VARIETIES

For WYOMING

A general view of some of the barley experimental plots at Laramie in 1941. Varieties shown in the foreground, left to right, are Odessa, Trebi, Beecher, Barbless, Glabron, Horn, Lico, and Lico.

PLANT HEALTH MYCOLOGICAL INSTITUTE
8 - AUG. 1949

UNIVERSITY OF WYOMING
AGRICULTURAL EXPERIMENT STATION
LARAMIE, WYOMING

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Agricultural Experiment Station

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*In cooperation with U. S. Department of Agriculture.

Barley Varieties for Wyoming

DAYTON L. KLINGMAN*

Barley produces more grain-feed per acre, in Wyoming, than any other crop (Fig. 1). With the increased emphasis upon greater livestock feeding within the state, the production of barley in order to supply the needed grain should not be overlooked. Many authorities consider barley approximately 85 per cent as valuable for feed as corn, pound for pound. On that basis in Wyoming, barley has produced on the average 166 per cent as much grain-feed per acre as has corn for the ten year period 1934-43. In only one county has corn produced as much grain-feed per acre as barley, and that on a relatively low acreage in Hot Springs County (1939-'45 average). In this case the yield of corn is not higher than that of adjoining counties, but the barley yield is lower. It would appear that the greatly increased production of barley in Wyoming for the last several years is to be commended and encouraged.

In addition to its higher yields barley is more tolerant of alkali in the soil and can be grown with a shorter growing season than the other cereals. If one of the smooth-bearded varieties is used, the straw is about equal to that of oats for livestock feeding.

Cultural practices have been quite extensively covered in a previous publication by Hartman and Vass (3)**. Timeliness of performing each of these operations cannot be overemphasized. It has been clearly established that, on the average, early planting of the cereals gives best results. A delay of but two weeks after spring work can be done has resulted in lowered yields. Timeliness in the application of irrigation water is also highly important. Plants should never be allowed to be deficient in water. In general, water should be applied at the critical growth periods: just before jointing, between jointing and heading (boot stage), and at heading time. If but one irrigation is possible, it can best be applied at the early boot stage of growth.

Good seed is the first requirement of a good crop. Plant only well cleaned, high germinating, weed-free seed of the best adapted varieties.

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** Numbers in parenthesis refer to literature cited.

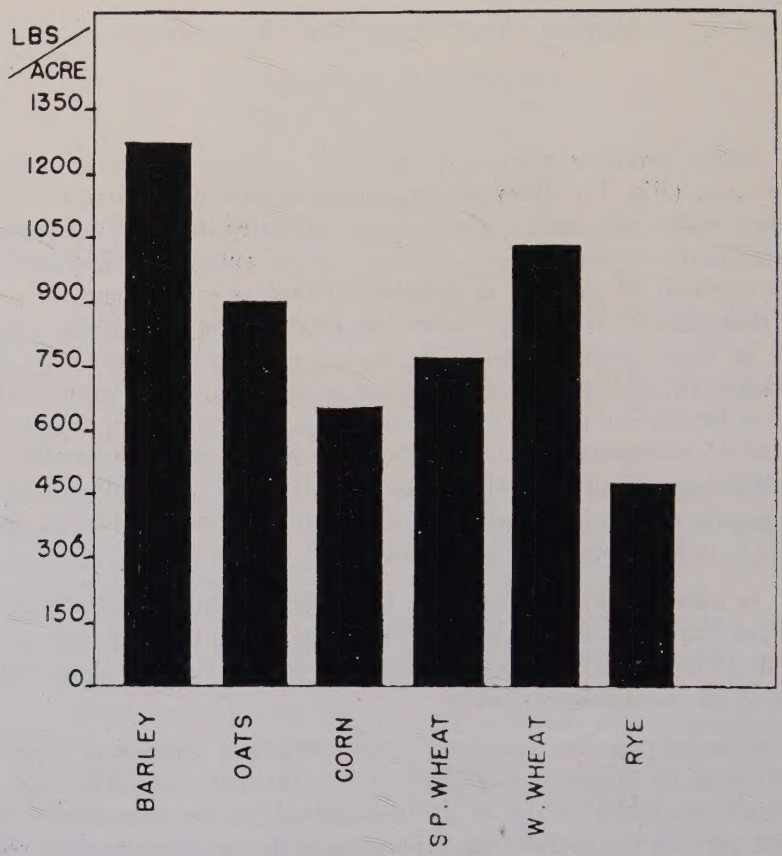

FIG. 1. Relative grain yields per acre of the cereal crops grown in Wyoming. Ten year average (1934-43) production taken from the U.S.D.A. publication Agricultural Statistics 1946.

The Experiment Station attempts to grow the important varieties of surrounding states, also the promising selections which are available from those states and, in addition, any new selections developed within Wyoming. In this way an evaluation of new material can be made in comparison to standard varieties being grown. Such a program of testing may result in finding varieties superior to those now being grown. In this way, also, growers may be informed as to relative adaptation of newer varieties in Wyoming, without the trouble and expense of each farmer or rancher making individual trial of those varieties.

Conclusions about relative adaptation of new varieties cannot be drawn after a single test. It is usually necessary to compare varieties for a number of years before valid comparisons can be made. One year may favor one variety while other conditions may favor another.

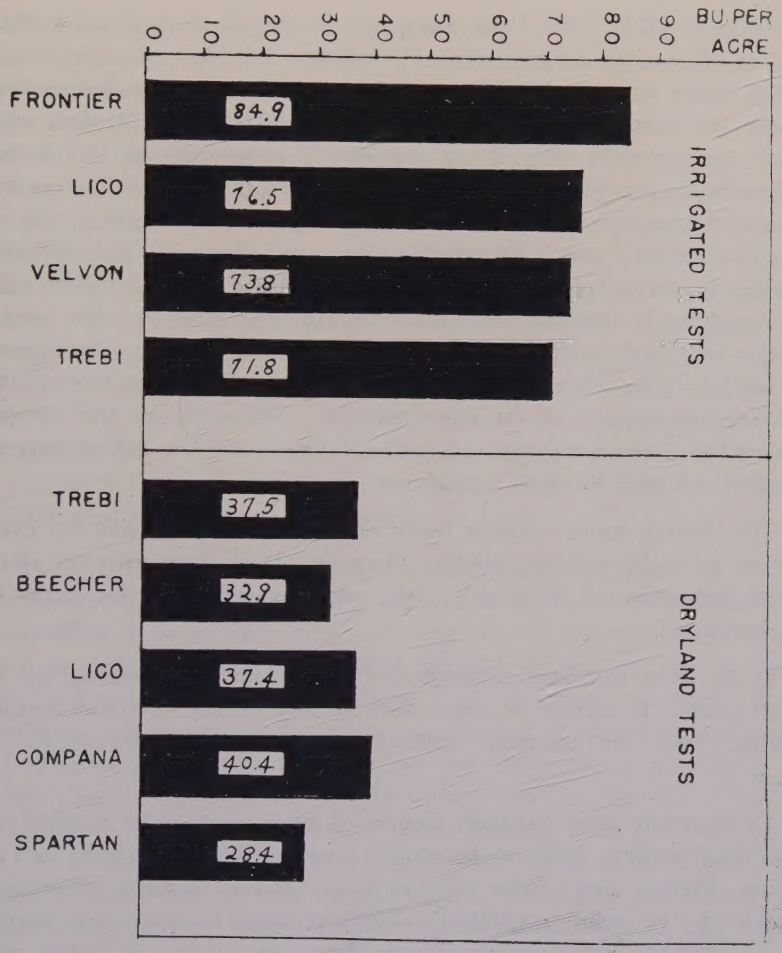

FIG. 2. Average yield of barley varieties grown in 10 separate tests on irrigated land from 1943 to 1947 (Laramie 4 yrs.; Torrington 4 yrs.; Powell 1 year; and Worland 1 year) and 13 separate tests on dry-land (Sheridan 1943-46, Gillette 1943-47, and Archer 1944-47).

VARIETIES RECOMMENDED FOR IRRIGATED LAND

Some yield data for certain varieties not mentioned otherwise are included in the tables so that the information can be used for reference by interested individuals.

Frontier (C.I. 7155)* has been one of the most vigorous varieties tested in Wyoming under irrigated conditions. It is a six-row, rough-bearded barley with erect mid-dense heads and a moderately strong straw. Frontier has been tested in Wyoming only since 1943, but in that period for ten separate tests (Fig. 2), it has yielded an average of 13.1 bushels per acre more than Trebi and 8.4 bushels more than Lico. The year to year performance of Frontier is shown in Tables 1, 2, 3, and 4. As can be seen in Tables 2 and 3, Frontier has averaged about one pound heavier in weight per bushel than Trebi at Laramie and has been 2.5 inches taller, five days later in heading, and somewhat stronger strawed. The seed of Frontier is slightly smaller than that of Trebi but has the same general coloring as Trebi. Frontier is not recommended for areas having very short seasons because of its later maturity. Although on the dry-land Frontier has a reasonably good record (Tables 5 and 7), earlier varieties are better adapted to those conditions.

The shorter, more compact heads of Frontier may deceive the casual observer as to its yielding ability. Because of this fact growers should reserve judgment of Frontier's yield performance until the grain has been harvested.

Loose smut has been somewhat of a problem in Wyoming the last several years. It cannot be controlled by any of the chemical methods available. Only the hot-water method is effective as treatment for the disease.

Frontier has been relatively free from loose smut under natural conditions in Wyoming, while under similar conditions such varieties as Lico, Beecher, Velvon, and Glacier have in some seasons smutted in excess of 20 per cent. In order to check Frontier's reaction to loose smut further, seed of Frontier was harvested from the smut-nursery in which there was 70 per cent loose smut in the rows harvested (the seed planted had been inoculated). At the same time seed of Beecher barley was harvested from nearby rows which had about 35 per cent natural infection. The seed of these two varieties was planted in 1947 and gave the following

* C.I. No. refers to United States Department of Agriculture accession number.

results: Beecher had 375 smutted heads per 80 feet of row; Frontier had five smutted heads per 80 feet of row. In this preliminary test Frontier had 1.3 per cent as much natural loose smut infection as Beecher. While Frontier has no physiological resistance to loose smut, apparently some factor in the variety prevents any great amount of infection from the fungus under ordinary growing conditions.

Frontier is a selection from Composite Cross (C.I. 5461). According to correspondence with H. Stevens (2) 28 varieties were crossed in all possible combinations. The composite was made by mixing equal amounts of the seed from the 379 F_2* rows. A portion of the bulk seed of this cross was grown in bulk until 1935 at the Branch Experiment Station, Aberdeen, Idaho. In the spring of that year it was space planted at Aberdeen and selections (F_8) were made from this seeding in the summer of 1935 by H. V. Harlan, M. L. Martini, G. A. Wiebe, and J. R. Harlan. These were tested for a number of years at Aberdeen in the cooperative work of the Agricultural Experiment Station and the United States Department of Agriculture. Seed of one of those which proved to be superior was sent to the Wyoming Experiment Station in the spring of 1943 and given the state number W47. Its performance was so outstanding that it was included in the cooperative tests grown in the state in 1944. Seed was increased in 1945, the variety was named Frontier early in 1946, and available seed was released in Wyoming in 1946.

Lico (C.I. 6279) is a smooth-bearded, six-row, relatively strong-strawed variety which has given good yields in Wyoming in spite of its susceptibility to loose smut (Fig. 2). For the ten separate irrigated tests shown in Figure 2, Lico has yielded 2.7 and 4.7 bushels per acre more than Velvon and Trebi, respectively. Only Frontier exceeded Lico in these tests. Under dry-land conditions Lico has an average almost equal to Trebi, being higher than Trebi for the years grown at Gillette and Archer (Table 7), but has averaged lower yields at Sheridan (Table 5). Lico has been from two to five days earlier heading than Trebi at Laramie and Sheridan (Tables 2, 3, and 6), it has been about equal in height, and it has averaged one to two pounds lighter in weight per bushel. The beards are sometimes broken from the grain less readily in Lico than in Trebi, which may partially account for the lowered test weight. Lico has an attractive appearance in the field, having moderately erect heads, and it stands somewhat better than Trebi.

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* F_2 = Second filial generation. (Parents = P; first generation = F_1; second generation = F_2; etc.)

Table 1.

Variety Yields Results of the Advanced Barley Plots at the Wyoming Experiment Station, Laramie, Wyoming*

Variety	C. I. No. (a)	BUSHELS PER ACRE 1937	1938	1939	1940	1941	1942	1943	1945	1946	1947	7 yr. Av.(b) 1940-47	5 yr. Av.(b) 1942-47	% of Trebi(c)
Trebi	936	86.1	70.5	17.0	51.9	97.6	106.2	59.9	78.2	94.2	72.0	80.0	82.1	100
Odessa	182	108.3	76.2	54.7	73.7	109.1	100.1	73.9	83.7					115
Horn	926	73.3	87.7	20.7		89.4	112.1	68.3	83.5	85.6	64.1		82.7	100
Glabron	4577	63.6	61.7	22.5	57.9	85.7								90
Charlottetown	W19 (d)	97.9	86.3	24.3	65.2									121
Spartan	5027	73.0	58.2	28.6	58.1									97
Vaughn	1367	70.2	38.7	25.6	42.3									78
Comfort	W17 (d)	63.5	56.0	17.1	61.9									88
O.A.C. 21	1470	91.4	64.0	22.4										102
Coast	690	95.7	84.7	27.2										119
Beldigiant	2777	104.6	79.0	42.0										130
Smyrna	W29 (d)	97.2	84.7	35.4										125
Hannchen	531	92.6	71.3	31.5										112
Barbless	5105				62.5	91.2	78.0	65.5						94
Beecher	6566				60.2	79.2	115.0	38.5						93
Lico	6279				66.2	101.5	147.2	53.7	92.8	105.8	92.0	94.2	98.3	118
Velvon	6109						131.0	67.0	75.6	111.3	87.4		94.5	115
Ezond	6265						109.2	67.1	71.7	102.5				103
Ezond Sel.	W3 (d)						138.8	71.3	86.5					121
Compana	5438						140.4	51.3	90.7	101.6				113
Frontier	7155								106.0	117.2	85.6			126
Glacier	6976										102.2			142
Bulk Sel.	7008									115.0	103.1			131
Bulk Sel.	7152									107.1	95.7			122
Gem	7243										114.2			159
Velvon Comp. 11	6088									114.0	87.4(e)			121
Standard error of the mean difference					7.8		6.8	4.9	4.2	5.1	6.0			

(a) C.I. No. is the accession number assigned by the United States Department of Agriculture.

(b) Crop completely hailed out in 1944.

(c) Per cent of Trebi for years grown, Trebi yields for those years—100%.

(d) W19, W3, etc., are Wyoming numbers.

(e) Yield taken from nursery nearby.

* Plot size has varied from 1/20 acre in 1937, 1/40 acre in 1938 and '39, 1/80 acre in 1940, to one 1/80 acre plot and 7 replications of nursery rows in 1945-'47. Since 1940 all plots have been replicated.

Table 2. **Agronomic Data for Varieties of Barley Grown at Laramie**

Variety C.I.No.	Av. Date Headed				1942-46(a)	Av. Hgt. in Inches				1942-46(a)	Av. Bu. Wgt.				1942-46 (a)
	1942	1943	1945	1946	Av.	1942	1943	1945	1946	Av.	1942	1943	1945	1946	Av.
Lico 6279	7/10	7/3	7/11	7/8	7/8	35	27	36	36	33.5	44.5	45.0	44.5	47.5	45.4
Compana 5438	7/16	7/3	7/12	7/7	7/9	28	23	28	33	28.0	49.0	50.5	49.0	51.5	50.0
Ezond Sel. W3	7/15	7/8	7/16			35	27	37			47.5	49.5	47.5		
Velvon 6109	7/13	7/7	7/13	7/10	7/11	33	27	36	36	33.0	47.5	48.5	46.5	49.7	48.0
Beecher 6566	7/4	6/27				29	23				47.0	43.0			
Horn 926	7/15	7/12	7/17	7/18	7/15	36	26	38	41	35.2	51.0	53.0	52.0	53.1	52.3
Ezond 6265	7/15	7/9	7/14	7/10	7/12	34	27	36	37	33.5	45.5	47.0	47.0	50.8	47.6
Trebi 936	7/15	7/10	7/16	7/13	7/13	33	26	33	35	31.7	44.0	48.0	45.5	48.3	46.4
Odessa 182	7/13	7/8	7/13			31	26	34			49.3	52.0	50.0		
Barbless 5105	7/15	7/12				41	32				49.5	50.5			
Frontier 7155			7/18	7/18				37	37				48.0	49.3	
Good Delta x Everest 7147				7/11					33					51.0	
Velvon Comp. 11 ..7088				7/11					38					50.7	

(a) Crop completely hailed out in 1944.

Table 3.
Yield and Agronomic Data for Varieties Grown in the Rocky Mountain Barley Nursery at Laramie, Wyoming

Variety	C. I. No.	Yield in Bushels per Acre 1945	1946	1947	3 Yr. Av. 1945-'47	1946-'47 Av. Date Headed July	1946-'47 Av. Wt. per Bushel	Av. Per Cent Lodging 1945	1946	1947	2 Year Av.	Height in Inches 1945	1946	1945-'46 Av.
Good Delta x Everest	7147	108.8	96.2	85.6	96.9	10	44	38	85	94.3	90	29	34	31
Hannchen x Minia	7156	99.5	105.8	104.2	103.2	17	45	86	97	95.0	96	30	36	33
Frontier	7155	97.4	111.2	90.4	100.0	17	47	48	40	88.3	64	36	40	38
Bulk Sel (36ab2031)	7152	95.3	113.9	89.4	99.5	11	46	26	52	97.3	74	36	36	36
Minia x Golden Pheasant	7153	93.9	121.4	98.4	104.6	13	44	36	60	96.7	78	30	34	32
Bulk Sel.	7154	91.4	134.2	78.7	101.4	14	44	12	29	92.0	60	37	39	38
Lico	6279	89.8	131.5	105.5	108.9	8	44	2	81	90.7	86	33	38	35
Glacier	6976	77.0	101.8	116.7	98.5	6	45	0	11	77.3	44	34	33	33
Bulk Sel (36ab6127)	7008	77.0	124.1	109.1	103.4	6	43	0	12	76.7	44	34	35	34
Velvon Comp. 11	7088	74.9	109.2	87.4	90.5	11	45	26	54	91.7	73	36	39	37
Trebi	936	72.2	107.6	88.7	89.5	12	46	30	91	92.7	92	35	38	36
Bulk Sel.	7245		129.6	90.6		13	45		86	90.0	88		38	
Colo. 3063 x Winter Club	7248		127.9	101.5		17	44		18	92.3	55		38	
Colo. 3063 x Winter Club	7247		121.4	109.5		14	44		5	55.0	30		36	
Bulk Sel.	7244		120.8	99.1		14	45		80	97.0	88		40	
Bulk Sel.	7246		120.4	95.8		12	45		76	80.0	78		38	
Gem	7243		110.6	110.8		5	42		14	48.3	31		33	
Arivat	6573			112.9						31.7				
Atlas No. 46	7323			94.4						75.0				
Lico I				98.7						94.0				
Standard error of the mean difference		7.8	9.1	9.4										

Table 4.

Average Yields for Barley Varieties Grown at the Substations in the Cooperative Irrigated Barley Nurseries.*

	Torrington							Worland	Powell	Afton					
Variety C.I.No.	1943	1944	1945	1946	1947	5 yr. Av.	% of Trebi (a)	1947	1947	1944	1945	1946	1947	4 yr. Av.	% of Trebi (a)
Lico 6279	37.0	39.1	71.7	81.0	76.2	61.0	110	58.9	26.9	64.1	38.4	76.2	53.9	58.1	106
Velvon 6109	38.2	38.0	74.6	74.9	82.3	61.6	111	49.0	28.8	59.4	32.1	87.4	51.5	46.1	84
Trebi 936	26.9	33.8	66.8	70.6	79.1	55.4	100	61.2	32.9	71.3	28.5	81.6	75.4	54.7	100
Odessa 182	38.5	39.4	77.8				122			69.6					98
Ezond 6265	37.0	42.2	70.0	67.3			109				31.7	70.9			93
Ezond Sel. W3	30.0	41.1	64.6				106								
Velvon Comp 11 ..7088			86.5	76.7	82.9		114	54.1	28.7			86.9	52.2		89
Compana 5438	28.6	54.7	67.8				118			78.0	31.5	93.0	66.4	67.2	123
Horn 926	39.2	43.1	67.2	69.8			111			59.1	25.1	92.7	67.4	61.1	112
Spartan 5027	22.3	33.8	62.8				93					62.0	38.0		89
Frontier 7155		61.1	74.4	79.3	77.7		117	60.9	28.2	60.3		80.4			122
Glacier 6976				69.6	47.2		78	49.2	28.0			83.2			102
Hannchen 531										49.6	25.0				75
Smyrna (W29)										70.8	28.5	89.2	66.7	64.0	117
Gem 7243					56.4		71	54.3	26.7				62.4		83
Beecher 6566										56.1	29.1	58.6	37.1	45.2	83
Bulk Sel (W46) 7008				87.3	57.9		97	67.7	30.2			84.4	56.6		90
Bulk Sel (W70) 7152					77.8		98	60.6	33.5				67.6		90

(a) Per cent of Trebi for years grown, if Trebi yields for those years equal 100%.

* Yields are in bushels per acre.

"Lico is of hybrid origin coming from the cross Coast x Lion. The cross was made in 1922 by D. W. Robertson, and a number of promising selections from it were tested at the Colorado Agricultural Experiment Station at Fort Collins. The best of these was named Lico and released to farmers in 1937." (1)

Velvon (C.I. 6109) has smooth beards, a relatively stiff straw, and a high degree of resistance to covered smut (6). In Wyoming, yields of Velvon have exceeded those of Trebi by two bushels per acre, under irrigation (Fig. 2). On dry-land Velvon has been about equal to Trebi and slightly better than Lico (Tables 5 and 7). Velvon is a very attractive barley in the field, having moderately erect heads, and it stands somewhat better than Trebi. Velvon has been one to two days earlier heading than Trebi, about the same height, and equal to or a little higher in weight per bushel.

In tests in Wyoming Velvon has been almost as susceptible to natural infections of loose smut as Lico.

"Velvon was selected from a Colorado selection 3063 x Trebi cross at the Utah Agricultural Experiment Station. The Colorado selection 3063 (from a Coast x Lion cross) was one of a number obtained from D. W. Robertson of the Colorado Agricultural Experiment Station. Velvon was one of a group of head selections made in 1932." (6)

Velvon Comp. 11 (C.I. 7088) is a reselection from Velvon, similar in appearance except for being slightly taller. It was selected as being more resistant to loose smut and having fewer sterile florets than the original variety. Velvon Comp. 11 for the short period tested has had a somewhat better yield record than Velvon in Wyoming (Tables 4 and 7). While the Velvon acreage in this state may advantageously be replaced with Velvon Comp. 11, the head-row material of this variety which was being grown at the Wyoming Experiment Station in 1947 for release as foundation seed loose-smutted so badly that all seed was discarded.

Trebi (C.I. 936) is a six-row, rough-bearded, vigorous barley which is widely grown on the irrigated lands in Wyoming. The straw is only moderately strong, and care in irrigation is important to prevent lodging. Trebi is resistant to loose smut, but susceptible to the covered smut. In Wyoming, Trebi's leaves stripe badly, and such stripe has not been controlled by the usual seed treatment. Trebi has been the standard of comparison for the last 20 years in irrigated areas, and in Wyoming tests it is still one of the high ranking varieties. The varieties mentioned above, however, have better records during the period that they have been grown

in Wyoming (Fig. 2). The record of Trebi on dry-land has been good. When all tests are averaged together (Fig. 2), the variety is exceeded only by Compana. At the Sheridan Field Station Trebi has led all varieties in average yield (Table 5).

According to Aberg and Wiebe (1) Trebi is a plant selection from a bulk lot of seed whose origin was in Trebizond, Asiatic Turkey. The selection now known as Trebi was made by H. V. Harlan in 1909 in the cooperative breeding work of the Division of Cereal Crops and Diseases of the U. S. Dept. of Agri. and the Minnesota Agricultural Experiment Station. Seed of Trebi was sent to Aberdeen, Idaho in 1913 and tested for a number of years. The variety showed exceptional yielding ability and was released from Aberdeen, Idaho in 1918.

VARIETIES RECOMMENDED FOR DRY-LAND

Compana (C.I. 5438) is a two-rowed, semismooth-awned, short weak-strawed variety. It has a good record in Wyoming in dry-land tests. It has had the best yield record when all dry-land tests are averaged together (Fig. 2). At Sheridan Field Station it has been grown for six years and has yielded within 0.5 bushel per acre of Trebi (Table 5). At Gillette and Archer it has yielded four and five bushels per acre more than Trebi (Table 7). In addition to its yield performance Compana has had an average test weight per bushel of 48 pounds compared to 45 pounds for Trebi (Table 6). It has been three days earlier heading and two inches shorter than Trebi in these same experiments. During the four years grown on irrigated land at Laramie it outyielded Trebi by 13 per cent (Table 1), but, because of its weak straw, it lodges badly and is not recommended for irrigated lands.

Acording to Litzenberger (5) Compana is resistant to loose smut and is moderately resistant to covered smut. "In field observations and in controlled experiments Compana has been less susceptible to attacks by grasshoppers than Horn, Trebi, and Glacier." (5)

"Compana is a selection from Composite Cross (C.I. 4116) made by H. V. Harlan at the Aberdeen substation, Aberdeen, Idaho in 1929. The Composite Cross from which it was selected was developed by the Division of Cereal Crops and Diseases in cooperation with the Idaho Experiment Station." (1)

Spartan (C.I. 5027) is a two-row, smooth-awned, strong-strawed variety of barley recommended for growing on dry-land. Spartan pro-

Table 5. **Yields of Barley Varieties Grown at the Sheridan Field Station (Dry-land) Since 1939.**

Variety	C.I.No.(a)	Bushels per Acre											
		1939	1940	1941	1942	1943	1944	1945	1946	Av. 1939-'46	Av. 1943-'46	% of Trebi (b)	Number of Years
Trebi	936	62.6	41.6	54.6	53.1	51.2	43.9	55.0	74.5	54.6	56.1	100	8
Compana	5438			59.6	55.4	52.7	38.8	50.4	80.6		55.6	99	6
Velvon	6109	63.4	35.9	61.5	53.9	46.2	32.8	61.9	70.7	53.3	52.9	98	8
Frontier	7155					50.1	32.4	57.3	71.4		52.8	94	4
Aber. Sel 36-6127	7008					52.7	24.4	66.3	62.7		51.5	92	4
Ezond	6265	50.4	39.7	62.3	61.9	32.9	33.2	58.4	71.4	51.3	49.0	94	8
Meloy	1176	43.6	32.1	50.1	46.2	53.9	16.8	63.0	52.3	44.7	46.5	82	8
Lico	6279				50.8	40.9	25.1	58.4	59.2		46.0	82	5
Glacier	6976					38.9	20.4	52.2	68.4		45.0	80	4
Beecher	6566	39.8	37.5	63.4	64.9	26.0	17.8	56.5	72.6	46.1	43.2	84	8
Atlas	4118	55.4	38.9	64.2	55.4	29.0	17.0	58.1	59.2	47.1	40.8	86	8
Spartan	5027	40.5	36.3	52.7	55.0	35.1	12.6	44.9	53.8	41.4	36.6	76	8
Horn	926	57.7	33.6	58.1	35.9							87	4
Wisc. No. 38	5105	42.0	33.9	53.5	36.7							78	4

(a) C.I. No. is the U. S. D. A. accession number.

(b) Per cent of Trebi for the years grown, Trebi = 100%.

Table 6. **Agronomic Data for Varieties of Barley Raised at Sheridan Field Station**

Variety	C. I. No.	Av. Date Headed 1939-46	Av. Date Headed 1943-46	Av. Date Ripe 1939-46	Av. Date Ripe 1943-46	Av. Plant Height 1939-46	Av. Plant Height 1943-46	Av. Test Wgt./Bu. 1939-46	Av. Test Wgt./Bu. 1943-46
Spartan	5027	6/20	6/23	7/23	7/28	34	36	49	49
Trebi	936	6/23	6/26	7/23	7/29	32	33	43	45
Meloy	1176	6/24	6/27	7/25	7/28	33	36	39	40
Velvon	6109	6/23	6/26	7/25	7/30	32	33	44	45
Ezond	6265	6/23	6/26	7/25	7/29	32	33	44	44
Atlas	4118	6/18	6/21	7/23	7/28	31	31	42	43
Beecher	6566	6/14	6/17	7/22	7/26	30	31	43	43
Compana	5438		6/23		7/27		31		48
Lico	6279		6/24		7/30		31		43
Frontier	7155		6/28		7/30		34		43
Aber. Sel. 36-6127	7008		6/22		7/28		34		44
Glacier	6976		6/25		7/27		33		44

duces grain of excellent feeding quality, being thin-hulled and high in weight per bushel (Table 6). However, it tends to shatter if allowed to stand until fully ripe. The yield record of Spartan in Wyoming has been only fair, but growers, in general, have liked the variety. It has yielded considerably less than Compana and Trebi in all of the tests on dry-land in Wyoming (Tables 5, 7, and Fig. 2). However, in experiments conducted at Alliance, Nebraska, for 1931-39 (in eight years of testing) Spartan yielded 18.0 bushels per acre as compared to 16.5 for Trebi (4). Alliance is approximately 100 miles east of Torrington, Wyoming. The discrepancy between the above dry-land results indicates the need for a longer testing period under dry-land conditions in order to make the best recommendations as to adapted varieties.

Spartan has consistently given lower yields under irrigation than other varieties (Tables 1 and 4). Spartan is susceptible to loose and covered smut.

Spartan is a hybrid barley coming from the cross Michigan Two-rowed x Black Barbless. The cross was made in 1916 by F. A. Spragg, of the Michigan Agricultural Experiment Station, who also grew the early generations. In 1920 a number of selections were made, and these were tested by E. E. Down, H. M. Brown, and F. H. Clark of the same station. Spartan was released to Michigan farmers in 1928. (1)

Beecher (C.I. 6566) is a six-row, early semismooth-bearded, strong-strawed barley, recommended particularly for southeastern Wyoming where its earliness may be advantageous in partially escaping the hot dry periods which may occur. Beecher has averaged nine days earlier heading than Trebi at Sheridan (Table 6) and 12 days earlier heading at Laramie (Table 2).

Beecher has exceeded Trebi in yield only at the Archer Field Station (Tables 5 and 7), has a better yield record at all Wyoming stations than Spartan, but has a poorer average yield record than Compana (Fig. 2). The variety is susceptible to loose smut.

Beecher resulted from the cross, Atlas x Vaughn, by V. H. Florell in 1927 at Davis, California, in the cooperative breeding work between the California Agricultural Experiment Station and the United States Department of Agriculture. Selections from this cross were sent to a number of Great Plains stations in 1934. At the Colorado Agricultural Experiment Station, Akron, the selections were tested for a number of years; one proved to be superior and was released to farmers under the name Beecher in 1940. (1)

Table 7. **Yields of the Cooperative Dry-Land Barley Nurseries.**

Variety	C. I. No.	Gillette							Archer					
		Bushels per acre.					Av.	Per Cent of	Bushels per acre.				Av.	Per Cent of
		1943	1944	1945	1946	1947	1943-47	Trebi (a)	1944	1945	1946	1947	1944-47	Trebi (a)
Horn	926	30.6	44.8	41.3	12.0	33.6	32.5	96	36.0	32.8	7.6			115
Smyrna	W29	39.3	48.0	44.1	32.0	36.3	39.9	118	39.4	30.6	11.0	31.5	28.1	120
Lico	6279	37.8	49.7	49.1	25.1	27.3	37.8	112	41.9	33.1	10.0	28.3	28.3	121
Trebi	936	23.0	47.7	33.6	25.9	38.6	33.8	100	36.5	22.6	7.1	27.3	23.4	100
Compana	5438	36.8	43.6	46.1	29.2	33.1	37.8	112	38.4	30.6	13.3	31.5	28.4	121
Spartan	5027	25.2	35.6	33.5	16.9	27.0	27.6	82	26.8	32.1	5.4	21.1	21.3	91
Beecher	6566	37.4	36.6	42.5	16.2	26.4	31.8	94	32.8	32.6	10.6	21.0	24.2	103
Ezond	6265	42.4	53.6	49.3	24.4			130	43.0	32.4	11.6			131
Velvon	6109		48.0	53.3	24.5	34.4		106	42.8	29.5	9.3	30.3	28.0	120
Frontier	7155		45.9	41.5	29.0			108	34.1	30.4	3.8			103
Munsing	6009				29.2	35.9		101			6.5	37.7		128
Gem	7243					29.2		76				25.4		93
Bulk Sel.	7008				27.1	33.2		93			7.9	30.0		110
Velvon Comp. 11	7088				27.0	34.5		95			11.7	26.4		111

(a) Per cent of Trebi for the years grown, Trebi = 100%.

Smyrna is a two-row, short, relatively weak-strawed but high yielding variety that has been grown for many years in Wyoming. It has had a good yield record on dry-land and under irrigation, but because of its lodging is usually not as desirable as some other varieties for irrigated land. In dry-land tests Smyrna yielded slightly more than Compana at Gillette (Table 7), but slightly less at Archer.

BARLEY VARIETIES ACCEPTABLE BUT NOT RECOMMENDED

Varieties of barley whose performance has not been equal to those recommended are included in this group. Also included are varieties showing promise but whose period of testing has been short; recommendation on these has been withheld pending more extensive testing.

Glacier (C.I. 6976) is a six-rowed, semismooth-bearded, early, relatively strong-strawed barley. It is resistant to covered smut but is susceptible to loose smut (5). On the average it has not quite equalled the performance of Lico in Wyoming (Tables 3, 4, and 5), although in certain individual tests it has been outstanding.

Glacier originated from the same cross as decribed for Beecher, i.e., Atlas x Vaughn. One of the selections from this cross proved to be superior in Montana and was released in that state in 1943. (1)

Gem (C.I. 7243) is a six-row, semismooth-bearded, relatively strong-strawed, early barley. It is susceptible to loose smut. For the very short period grown in Wyoming it has not been quite equal to Lico in yield (Tables 3, 4, and 7). Further testing is needed with this variety.

Gem originated from the cross Atlas x Vaughn and has been released for production in Idaho.

Munsing (C.I. 6009) is a two-row, semismooth-bearded barley with very short, moderately weak straw. It has had a good yield record on dry-land for the short period grown (Table 7) in Wyoming.

Munsing is a selection made in 1920 by F. A. Coffman of the United States Department of Agriculture, at the United States Dry-land Field Station, Akron, Colo. It is believed the selection originated from a field cross of Blackhull x White Smyrna. In tests it proved superior in yield and subsequently was released from the United States Dry-land Field Station in 1944. (1)

Horn (C.I. 926) is a two-row, rough-bearded, tall, midseason to late variety which has been grown in Wyoming for many years. In Wyoming it has not been excelled in its yield when used for hay. It is tall and stools prolifically. Compana has given higher yields of grain on dry-land (Tables 5 and 7) while Horn has been about equal to or slightly better than Trebi when irrigated (Tables 1 and 4). However, it is not recommended for such use, except as a hay crop, because of its tendency to lodge under conditions favoring rank vegetative growth.

Horn is a plant selection made in 1909 by H. V. Harlan from parental material obtained at the Paris Exposition in 1900 from the Austrian exhibit. The variety was probably first released in Wyoming. (1)

Odessa (C.I. 182) is a six-rowed, rough-bearded, weak-strawed variety which has had an excellent yield record under irrigation (Tables 1 and 4). However, Odessa lodges badly if particular care is not taken in irrigation.

Odessa is similar to Manchuria. It was introduced from South Russia into Canada and later was introduced into the United States from Ottawa in 1902. After testing for a number of years it was released in South Dakota in 1914. (1)

SUMMARY

1. Barley produces more grain-feed per acre in Wyoming than any other crop.
2. Recommended varieties for irrigated land in Wyoming are:
   Frontier is a vigorous, six-row, rough-bearded barley with erect mid-dense heads and relatively strong straw. It has been only slightly smutted under natural conditions in Wyoming.
   Lico is a smooth-bearded, six-row, relatively strong-strawed variety which has given higher yields than Velvon or Trebi in irrigated tests in Wyoming. Lico is susceptible to loose smut.
   Velvon has smooth-beards, six rows, a relatively stiff straw, and a high degree of resistance to covered smut, but has been susceptible to loose smut. It has a better yield record than Trebi. Velvon Comp. 11 has a slightly better performance than Velvon.
   Trebi is a six-row, rough-bearded, vigorous barley which has been widely grown in Wyoming. Trebi lodges more than those varieties named above. It is resistant to loose smut but susceptible to covered smut and barley stripe.
3. Recommended varieties for dry-land are:
   Compana is a two-rowed, semismooth-bearded, short, weak-strawed variety. It has the best average dry-land record in Wyoming. It has

high test weight and is resistant to loose smut and moderately resistant to covered smut.

Spartan is a two-row, smooth-awned, strong-strawed variety which produces grain of excellent feeding quality. It tends to shatter somewhat if allowed to stand until fully ripe. Spartan is susceptible to loose and covered smuts.

Beecher is a six-row, early, semismooth-bearded, strong-strawed barley recommended particularly for southeastern Wyoming. It is susceptible to loose smut.

Smyrna is a two-row, short, relatively weak-strawed but high yielding variety.

4. Barley varieties acceptable, but not recommended (further testing may result in recommending some of these) :
   Glacier, Gem, Munsing, Horn, and *Odessa.*
5. Yield data for many varieties which may be of interest to individuals, but which have not been discussed in this bulletin, are included in the tables.

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